

What is claimed is:

- 1 1. A process for preparing an advanced epoxy material, comprising the steps of:
2 continuously providing to an extruder: (i) an epoxy resin having an average
3 of more than one vicinal epoxy group per molecule; (ii) a linking material having
4 attached thereto an average of more than one moiety reactive with the vicinal epoxy
5 group of the epoxy resin; and (iii) a catalytic amount of at least one iminium salt
6 catalyst for promoting the reaction between the epoxy resin and the linking material;
7 and
8 operating the extruder at a temperature greater than 200 °C to cause a reaction
9 between the epoxy resin and linking material for a sufficient residence time to
10 produce an advanced epoxy resin; and
11 continuously removing the produced advanced epoxy resin from the extruder.
- 1 2. The process of claim 1, wherein the iminium salt catalyst has the general
2 formula
3
$$R^1R^2R^3P=N^+=PR^1R^2R^3 \quad Z^-$$

4 wherein
5 each R¹, R² and R³ is independently an aromatic, inertly substituted aromatic,
6 aliphatic, cycloaliphatic, inertly substituted aliphatic, or inertly
7 substituted cycloaliphatic group; and
8 Z is any suitable anion.
- 1 3. The process of claim 1, wherein the catalyst is a bis(triphenylphosphine)
2 iminium salt.
- 1 4. The process of claim 2, wherein each R¹, R² and R³ is independently an
2 aromatic or inertly substituted aromatic group.
- 1 5. The process of claim 2, wherein Z is selected from the group consisting of
2 halides, carboxylates, carboxylic acid complexes, conjugate bases of inorganic acids,
3 and conjugate bases of phenols or an anion derived from a bisphenol or biphenol.
- 1 6. The process of claim 1, wherein the catalyst comprises from about 0.04 to
2 about 1 weight percent of the combined weight of the reactants.

- 1 7. The process of claim 1, wherein the epoxy resin comprises diglycidyl ethers
2 of biphenol and halogenated derivatives thereof.
- 1 8. The process of claim 1, wherein the linking material comprises a dihydric
2 phenol.
- 1 9. The process of claim 1, wherein the extrudate has a weight average molecular
2 weight from about 1,000 to about 100,000.
- 1 10. The process of claim 1, wherein the extrudate has an epoxide equivalent
2 weight of from about 500 to about 25,000.
- 1 11. The process of claim 1, wherein the ratio of aromatic hydroxyl groups of the
2 linking material to epoxide groups of the epoxy resin is between from about 0.01:1 to
3 about 5:1.
- 1 12. The process of claim 1, wherein the extrusion reaction is conducted at a
2 temperature greater than about 220 °C.
- 1 13. The process of claim 1, wherein the residence time of the reactants is
2 between about 0.01 and about 0.5 hours.
- 1 14. The process of claim 1, wherein the process further comprises continuously
2 providing a solvent to the extruder.
- 1 15. The process of claim 1, wherein the solvent is provided in a minimal amount
2 necessary to facilitate the delivery of the catalyst.
- 1 16. The process of claim 1, wherein the process is essentially neat.
- 1 17. The process of claim 1, further comprising the step of continuously providing
2 to an extruder: (iv) one or more chain terminators.
- 1 18. A coating composition, comprising: the advanced epoxy resin of claim 1.
- 1 19. An advanced epoxy resin formed by an extrusion process, wherein the
2 advanced epoxy resin is the extruded reaction product of an epoxy resin and a
3 linking material in the presence of an iminium salt catalyst.